FAA-E-2162b
January 16, 1969

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION SPECIFICATION

MICROPHONE, HAND-HELD

1. SCOPE

1.1 Scope.- The equipment specified herein is a hand-held dynamic or controlled-magnetic microphone assembly for use in communication facilities. The assembly consists of a microphone, mounted in a case designed for suppression of undesired background sounds and voices, a switch provided to permit push-to-talk operation of the system in which it is connected, and a connecting cord and plug. The noise suppression characteristic requires that the microphone face be held close to the mouth of the user in order to clearly reproduce the user's speech.

2. APPLICABLE DOCUMENTS

2.1 FAA standards.- The following FAA standard, of the issues specified in invitation for bids, or request for proposals, forms a part of this specification:

FAA-STD-013 Quality Control Program Requirements

(Copies of this specification, and of other applicable FAA specifications and drawings, may be obtained from the Federal Aviation Administration, Washington, D. C. 20590, Attention: Contracting Officer. Requests should fully identify material desired, i.e., specification numbers, dates, amendment numbers, complete drawing numbers; also the request should identify the invitation for bid, request for proposal, or the contract involved or other use to be made of the requested material.)

3. REQUIREMENTS

3.1 Definitions

3.1.1 Service conditions.- As used herein, the term "service conditions" shall refer to the range of temperatures between +10°C and +40°C and of relative humidity between 10% and 80%.

3.1.2 Face.- As used herein, the term "face" shall refer to the side of the microphone or diaphragm intended for user speech input.

3.2 Performance.- The microphone shall meet the performance requirements, of the following subparagraphs (throughout the service conditions), when operating into resistive loads of 150 ohms ±10%. The microphone or cord shall not include an amplifier.

3.2.1 Output level.- The output level, measured at the connector, shall be a minimum of -60 dB referenced to 1 milliwatt. The signal source shall be located 1/4 inch from and normal to the microphone face, and shall deliver an acoustical intensity of 10 dynes/square centimeter to the microphone face at 1000 Hz.

3.2.2 Frequency response.- The frequency response of the microphone shall fall within the range from ±7 dB (referenced to the 1000 Hz response) over the frequency range from 300 Hz to 3000 Hz. The microphone shall be driven by a sound source located and adjusted as described in 3.2.1.

3.2.3 Harmonic distortion.- The total harmonic distortion in the microphone output shall not exceed five percent when the microphone is driven by an acoustical intensity of 100 dynes/square centimeter from a source located as described in 3.2.1. This requirement shall be met throughout the range from 300 Hz to 3000 Hz.

3.2.4 Noise cancellation.- With sound waves originating from each of two sources, one 1/4 inch from and normal to the microphone face and the other at least 12 inches away from and normal to the microphone face, and with both sources operating (one at a time) at a frequency of 300 Hz and producing the same acoustical intensity at the face of the microphone, the microphone output from the far source shall be down not less than 12 dB referred to the output from the near source. The microphone output from the far source shall remain at least 12 dB below the reference output from the near source as the far source is moved to any other point on the surface of an imaginary sphere of at least a 12-inch radius with the microphone located at the center.

3.2.5 Switch contacts.- The push-to-talk switch contacts shall be rated for operation with an inductive load of 0.5a at 48 V DC.

3.2.6 Switch life.- The push-to-talk switch shall be manufacturer-rated for a minimum of one million failure-free operations unloaded.

3.3 Construction.- Construction shall be accomplished in accordance with the following subparagraphs.

3.3.1 Microphone case.- The microphone case, constructed of high-impact plastic with polished exterior surfaces, shall conform to the requirements of the following subparagraphs.

3.3.1.1 Design.- The microphone case shall be shaped as a flattened inverted teardrop to be comfortably held in the hand, with its point truncated for the cord entrance. There shall be no sharp projections or edges on the outer surface of the case as assembled.

3.3.1.2 Dimensions.- The completed instrument, less cord, shall be no more than 2 3/4 inches thick, 2 5/8 inches wide at the widest point, and not more than 4 inches long. The switch actuator is not included in the above dimension.

3.3.1.3 Openings for noise cancellation.- Openings for noise cancellation shall be so located and arranged that they are not covered by the operator's hand or fingers when the instrument is held in either the left or right hand during actual use.

3.3.2 Push-to-talk switch.- A non-locking, spring-return switch rated per 3.2.6 shall be furnished and shall conform to the following subparagraphs.

3.3.2.1 Mounting.- The push-to-talk switch shall be mounted in the upper left quadrant of the microphone case as viewed from the front.

3.3.2.2 Contacts.- The push-to-talk switch shall consist of a set of normally open and a set of normally closed contacts.

3.3.2.3 Wiring.- One set of contacts shall be wired across the control line, shorted when the push-to-talk switch is depressed and open when the switch is released. The second set of contacts shall be wired across the audio output line, open when the push-to-talk switch is depressed and shorted when the switch is released.

3.3.3 Microphone cord.- A retractile four tinsel conductor microphone cord shall be furnished and shall conform to the following subparagraphs.

3.3.3.1 Length.- The cords shall be available in two lengths and be supplied as called for in the contract schedule.

(a) Extended length minimum of 15 feet, retracted length not more than 3 feet.

(b) Extended length minimum of $7\frac{1}{2}$ feet retracted length not more than 1 3/4 feet.

There shall be a 2 to 4 inch straight section at each end of the cord.

3.3.3.2 Coil diameter.- When retracted, the coils shall not be more than 1-1/16 inch in outside diameter.

3.3.3.3 Shielding.- Two of the four conductors shall be enclosed with served tinsel shield providing not less than 80% electrical shielding.

3.3.3.4 Insulation.- Insulating materials shall provide not less than 1.0 megohm resistance measured at 500 V DC between audio and control or shield circuits or across open push-to-talk switch contacts.

3.3.3.5 Jacket.- The microphone cord shall be encased in a neoprene jacket.

3.3.3.6 Microphone termination.- The microphone cord shall be lug connected to terminals inside the microphone case. These terminals shall be readily accessible as part of the switch, transformer, or on a separate terminal strip secured inside the case. The cord shall be replaceable.

3.3.3.7 Reinforcement.- The cord shall be reinforced at the point of emergence from the microphone case by an elongated flexible guide or grommet which extends far enough out of the case to prevent greater flexing at this point than elsewhere in the cord length. A cable clamp inside the case shall provide strain relief for the cable wires.

3.3.4 Connector.- The free end of the microphone cord shall be fitted with a connector meeting the requirements of the following subparagraphs.

3.3.4.1 Connector type.- The connector shall be Amphenol type 91-MC4M or equal, complete with coupling ring, clamp grip (strain relief), and cord protection. In order to permit use of the microphone with existing FAA equipment, the connector shall mate with an Amphenol type 91-MC4F connector.

3.3.4.2 Connector pin assignment.- Pins 1 and 2 of the connector shall connect via the cord to the transducer element or the transformer output, whichever is applicable, and to the normally-closed set of push-to-talk switch contacts. Pins 3 and 4 of the connector shall connect via the cord to the normally-open set of push-to-talk switch contacts.

3.3.5 Shielding termination.- The shielding shall terminate on Pin 1, but be capable of transfer to Pin 2 when necessary.

3.4 Technical information.- Each microphone furnished shall be packaged individually and shall include in its carton the following technical information: wiring diagram, replaceable parts list with manufacturer's parts number, and the manufacturer's name and address.

4. QUALITY ASSURANCE PROVISIONS

4.1 The contractor shall be responsible for conducting all inspection and testing to assure product conformance with the requirements of this specification and shall utilize, for this purpose, a quality control program in accordance with FAA-STD-013.

5. PREPARATION FOR DELIVERY

5.1 Packing.- Packing shall be of a good commercial grade to insure delivery of the equipment without damage.

6. NOTES

6.1 None

* * * * *